# Appendix A:
# Quick Reference List of Design Standards

The 1991 AASHTO Guide for the Development of Bicycle Facilities (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD) shall be used as the prevailing national standards guiding bicycle facility development within Jefferson County. To assist County, DOT District, and local staff in planning bicycle facilities, the following quick reference list summarizes key design elements of AASHTO and MUTCD. This listing is intended to serve as a convenient reference point for applicable standards and guidelines. For comprehensive guidance and specific interpretation, the user is referred to detailed discussions within the respective publications, as identified below.

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**➢ GENERAL ROADWAY IMPROVEMENTS ➢**

| | | |
|---|---|---|
| *Drainage Grates* | do not use a parallel-bar grate | AASHTO..... p.12 |
| | advance pavement marking | MUTCD..... p.9C-6 |
| *Railroad Crossings* | | |
| ➢ crossing angle | ideally, cross at 95 degree angle | AASHTO..... p.12 |
| ➢ warning signs | 315 feet min. before crossing | MUTCD..... p.9C-4 |
| ➢ pavement markings | 250 feet min. before crossing | MUTCD..... p.9C-4 |
| *Traffic Control Devices* | | |
| ➢ clearance interval | bicycle speed of 10 mph with 2.5 sec. braking time | AASHTO..... p.12 |
| *Signage* | | |
| ➢ lateral placement | 2 feet min./12 feet max. | MUTCD..... p.2A-8 |
| ➢ height | 5 feet min. | MUTCD..... p.2A-14 |
| *Maintenance Practices* | | |
| ➢ bikeway standards | same or greater maintenance standard than vehicular travelway | AASHTO..... p.41 |

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**➢ PAVED SHOULDERS ➢**

| | | |
|---|---|---|
| *Shoulder Width* | | |
| ➢ at 35 mph | 4 feet min. | |
| ➢ at speeds > 35 mph | greater than 4 feet | AASHTO..... p.14 |

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## ➢ WIDE CURB LANES ➣

| | | |
|---|---|---|
| *Right-Hand Lane Width* | 14 feet min. | AASHTO..... p.15 |
| *Signage* | none recommended | |

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## ➢ BICYCLE LANES ➣

| | | |
|---|---|---|
| *Bicycle Lane Widths* | | |
| ➢ ideal conditions | 4 feet min. | |
| ➢ next to curb | 5 feet min. | |
| ➢ next to parking lane | 5 feet min. | |
| ➢ combined bike/parking | 12 feet min. | AASHTO..... p.18 |
| *Lane Placement* | adjacent to right-hand vehicle lane | AASHTO..... p.17 |
| *Intersections* | pavement markings | AASHTO..... p.18<br>MUTCD..... p.9C-2 |

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## ➢ DESIGNATED BICYCLE ROUTES ➣

| | | |
|---|---|---|
| *Signage* | | |
| ➢ general signing | "Bike Route" signs | MUTCD..... p.9B-10<br>MUTCD..... p.9B-13 |

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## ➢ BICYCLE PATHS ➣

| | | |
|---|---|---|
| *Path Widths* | | |
| ➢ typical | 10 feet min. | AASHTO..... p.23 |
| ➢ with heavy multi-use | 12 feet min. | |
| ➢ exception under certain prevailing conditions | 8 feet min. | AASHTO..... p.23 |
| *Clearances* | | |
| ➢ graded shoulder area | 2 feet min. | AASHTO..... p.24 |
| ➢ from trees, poles, etc. | 3 feet min. | |
| ➢ vertical clearance | 8 feet min./10 ft desired | |

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| | | |
|---|---|---|
| *Grades* | | |
| ➢ longitudinal | 5% max. desired | AASHTO..... p.27 |
| ➢ cross slope | 2% min. | AASHTO..... p.35 |
| *Design Speed* | | |
| ➢ general | 20 mph min. | AASHTO..... p.25 |
| ➢ if grade is > 4% | 30 mph | |
| *Curves* | | |
| ➢ radius | 95 foot min. | AASHTO..... p.26 |
| ➢ superelevation | 2% min. - 5% max. | |
| *Stopping/Sight Distances* | are grade and speed dependent<br>125 feet min. | AASHTO..... p.28 |
| *Pavement Structure* | must be determined based upon site-specific analysis | AASHTO..... p.32 |
| *Lighting* | 0.5-2 footcandles | AASHTO..... p.36 |
| *Structures* | | |
| ➢ clear width, minimum | same as approach width | AASHTO..... p.33 |
| ➢ clear width desired | approach width + 2 ft each side | |
| ➢ vertical clearance | 10 min. | AASHTO..... p.33 |
| ➢ railings | 4.5 feet high | |
| smooth rub rails | attach at height of 3.5 feet | AASHTO..... p.33 |
| *Intersections* | | |
| ➢ crosswalk markings | use diagonal or longitudinal lines for added visibility | MUTCD..... p.3B-23 |
| ➢ signalized crossings | | |
| min. pedestrian volume | 100+ per 4-hour period or<br>190+ per 1-hour period | MUTCD..... p.4C-4 |
| ➢ vehicular warning signs | | |
| Bike Xing signs, rural | 750' before crossing | MUTCD..... p.9B-6 |
| Bike Xing signs, urban | 250' before crossing | |
| ➢ limited vehicular access | | |
| entrance bollards | 5 feet min. between posts | AASHTO..... p.36 |
| split path | 5 foot min. path width | |
| ➢ with gravel drives | add 10' paved apron | AASHTO..... p.33 |

| | | |
|---|---|---|
| *Path Pavement Markings* | | |
| ➢ center striping | 4" yellow line, as needed | AASHTO..... p.32 |
| gap ratio | 3' line with 9' gap | MUTCD..... p.9C-1 |
| ➢ user separation striping | 4" white line | |
| ➢ symbols/word messages | as per MUTCD guidelines | MUTCD..... p.9C-4 |
| *Path Signage* | | |
| ➢ lateral placement | 3' min. - 6' max. | MUTCD..... p.9B-1 |
| ➢ height | 5' max. - 4' min. | |
| ➢ longitudinal placement | | |
| regulatory signs | where regulation applies | MUTCD..... p.9B-6 |
| hazard warning signs | 50' min. before hazard | MUTCD..... p.9B-9 |
| RR Xing signs | 315' min. before RR Xing | MUTCD..... p.9C-4 |

**Key Reference Documents**

AASHTO Guide for the Development of Bicycle Facilities

Published by the American Association of State Highway and Transportation Officials (AASHTO), these guidelines provide information on the development of new facilities to enhance and encourage safe bicycle travel. Available for $13 including postage from: AASHTO, 444 N. Capitol Street NW, Suite 249, Washington, DC 20001. Phone orders: (202) 624-5800

Manual on Uniform Traffic Control Devices (MUTCD)

This U.S. Department of Transportation, Federal Highway Administration manual contains unified national standards for signs, signals, markings, and devices on all streets and highways open to public travel. "Part IX: Traffic Controls for Bicycle Facilities" establishes national recommendations for signing and marking both on-road and off-road bicycle facilities. The 1988 Edition of the MUTCD is available for $22 from: The U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Phone orders: (202) 783-3238 Fax: (202) 512-2250.

Wisconsin Bicycle Planning Guidance

WisDOT has developed state guidelines for Metropolitan Planning Organizations and communities planning and developing bicycle facilities, based upon the above publications. As part of the TransLinks 21 multimodal planning process of WisDOT, the guidance is available at no charge from: WisDOT Division of Planning and Budget, 4802 Sheboygan Avenue, P.O. Box 7913, Madison, WI 53707.